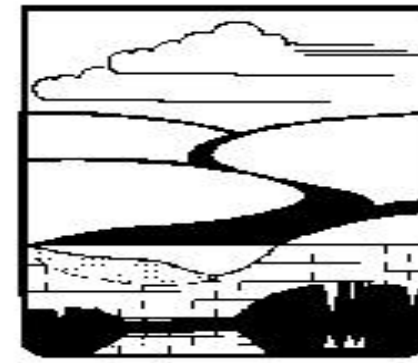




Kentucky Division of Water



Kentucky Waterways Alliance



Your trip to the creek is a wonderful learning experience. Ensure that the visit is successful by always making certain that your groups have their assignments for the field trip. Make certain that they know their stations and what is their program for the day by a stream.

## **SAFETY TIPS**

There are obvious hazards when hunting for macroinvertebrates, and if you take children out it is important that strict supervision is maintained at all times. Its is important to adhere to some very basic field safety requirements when discovering critters in the creek and other projects..

- ◆ Remember, it is important to choose a site that is easily accessible and stable. Always obtain permission from the landowner before visiting a creek site.
- ◆ Carry a safety kit and have someone with safety training with you.
- ◆ Always let someone know that you are critter hunting and for how long you will be on site and when you are expected back.
- ◆ Wear appropriate clothing, footwear, and sun protection or wet weather gear, depending on the weather.
- ◆ Always have partner groups of 3 or 4 students during the research assignments.
- ◆ Ensure that an adult is present and ideally downstream of students, so they can pull them out of the water should they happen to fall in.
- ◆ Use common sense when at the site and when in or near water. Watch out for snakes, holes, broken glass, debris, hostile dogs and strong water currents.
- ◆ Be prepared for the insects such as ticks, hornets, wasps, mosquitoes and other pests not mentioned.
- ◆ Always use safety gloves and wash your hands after being in the water.
- ◆ Don't drink water from the source! Bring your own water.
- ◆ Watch for poison oak, stinging nettles and other types of vegetation that may cause rashes, irritations and scratches.
- ◆ Please don't walk on unstable stream banks; it might make the bank collapse.
- ◆ If the water smells funny, don't attempt to critter hunt.
- ◆ Be sure that you have emergency telephone numbers and medical information with you.
- ◆ If at anytime you feel uncomfortable about the condition of the site or your surroundings

**STOP AND LEAVE! YOUR SAFETY IS THE MOST IMPORTANT THING!**

Websites used for specimen identification sheets:

<http://water.nr.state.ky.us/www/bugs/intro.htm>

<http://140.211.62.101/aquaticinsects/aqinsect.html>

<http://www.state.ky.us/nrepc/water/bioindpg.htm>

<http://www.dec.state.ny.us/website/dow/stream/orderpageone.htm>

<http://www.epa.gov/bioindicators/html/dobsonflies.html>

<http://www.people.virginia.edu/~sos-iwla/Stream-Study/Key/Bugs/>

This work was funded in part by a grant from the U.S. Environmental Protection Agency under §319(h) of the Clean Water Act through the Kentucky Division of Water to the Big Sandy RC&D (Grant # C9994861-97).

**Big Sandy Resource Conservation  
& Development Area Inc.**



Serving seven counties in the  
Big Sandy watershed area



## Indicators of Good water quality



**Dobsonflies**



**Caddisflies**



**Gilled Snails**

**Mayflies**



**Stonefly**



**Water Penny**

## Indicators of Moderate Water Quality



**Alderfly**



**Crane flies**



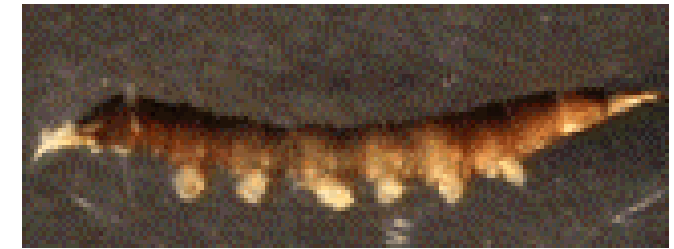
**Crayfish**



**Clams**



**Dragonfly  
larva**



**Watersnipe**



**Fishflies**



**Scuds**



**Sowbug**



**Water Beetle**

**Damselfly**



**Riffle Beetles**

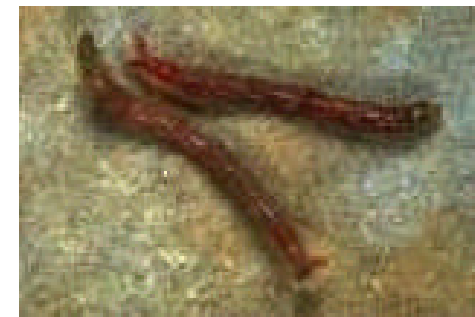
## Indicators of Poor Water Quality

**Aquatic Worm**

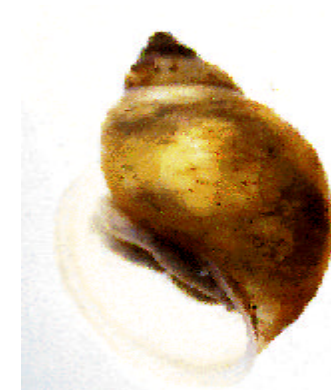


**Blackflies**

**Leeches**



**Midge Flies**



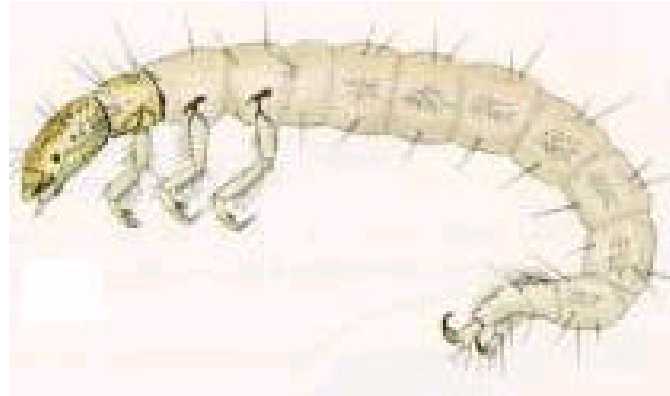
**Pouch Snails**



**Other snails**

# Caddisflies

## Indicators of Good Water Quality (Group One)



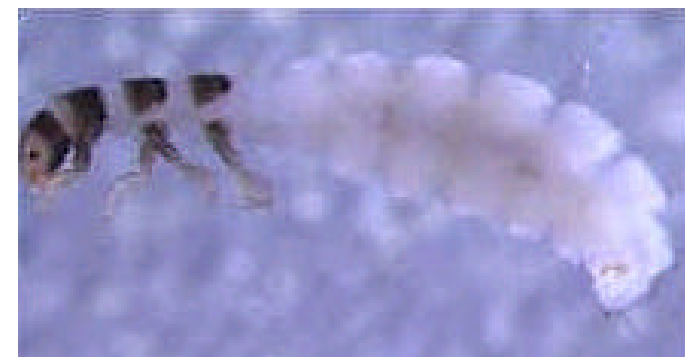
Caddisfly larva

Caddisfly larva

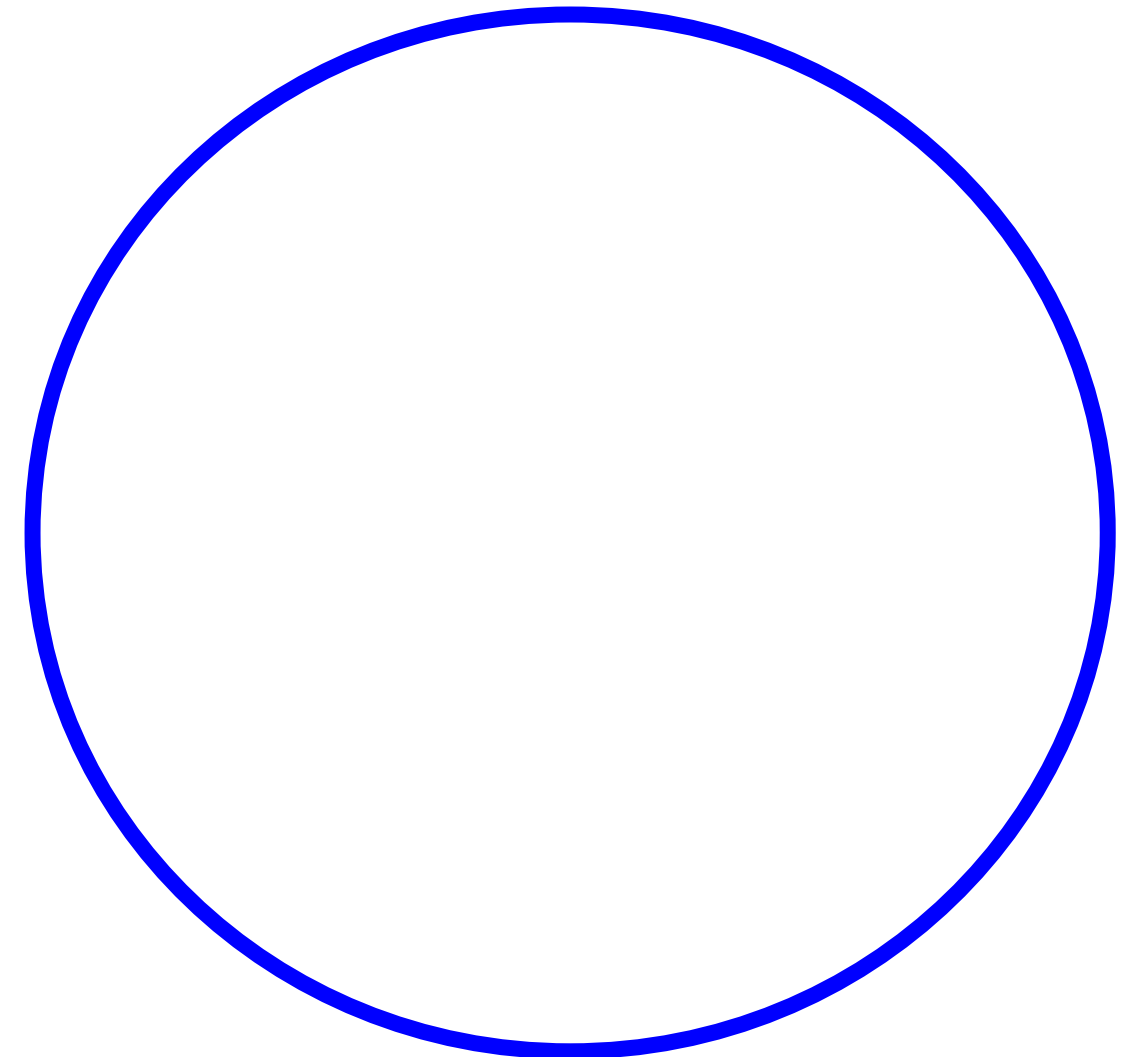


Caddisfly:

- ◆ Up to 1 ½ inches, 6 hooked legs on upper third of body
- ◆ 2 hooks at back end
- ◆ May be in stick, rock or leaf case with its head sticking out
- ◆ May have fluffy gill tufts on lower half.



Caddisfly larva



Relative Size \_\_\_\_

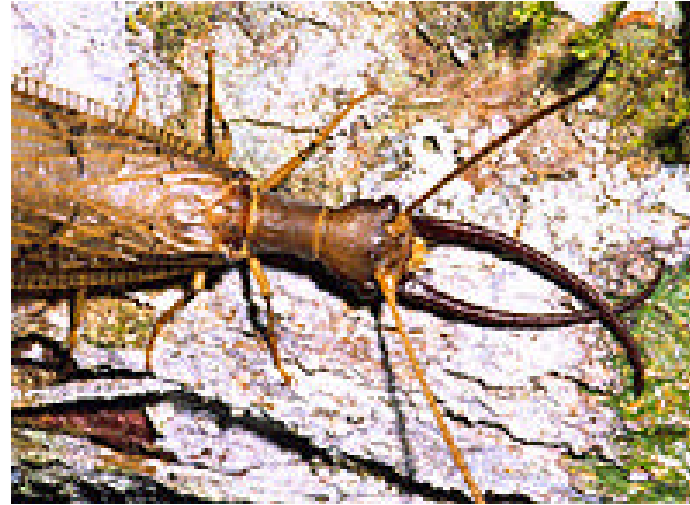


# Dobsonflies

## Indicators of Good Water Quality (Group One)



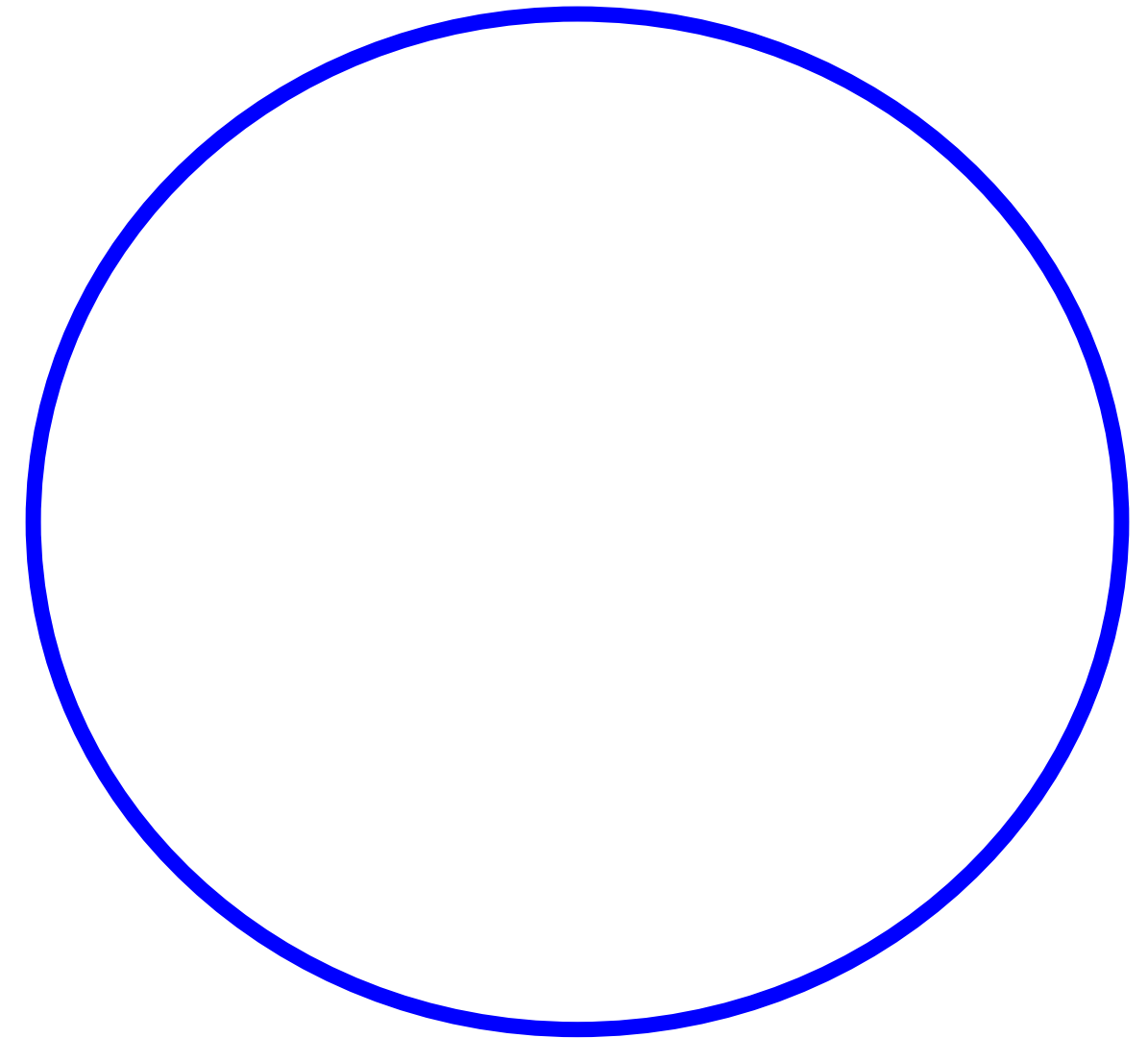
Close-up of dobsonfly larvae mandibles



Dobsonfly Adult



- ◆ Commonly called hellgrammites.
- ◆ Measures 3/4 - 4 inches in length.
- ◆ Body is elongate and somewhat flattened.
- ◆ Large pinching jaws.
- ◆ Lateral appendages along the length of the abdomen.
- ◆ Cotton-like gill tufts on underside of abdomen.
- ◆ Abdomen terminates in two small prolegs, each bearing two claws.
- ◆ Short inconspicuous antennae.
- ◆ Feed on other aquatic insects.
- ◆ Usually found on the underside of large rocks in cool, slow-moving streams.
- ◆ Handle hellgrammites carefully, larger individuals may deliver a painful pinch!



Relative Size \_\_\_\_\_

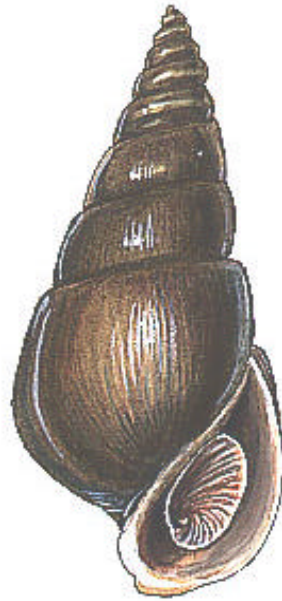


Dobsonfly larvae

# Gilled Snails

## Indicators of Good Water Quality (Group One)

### Gilled Snail

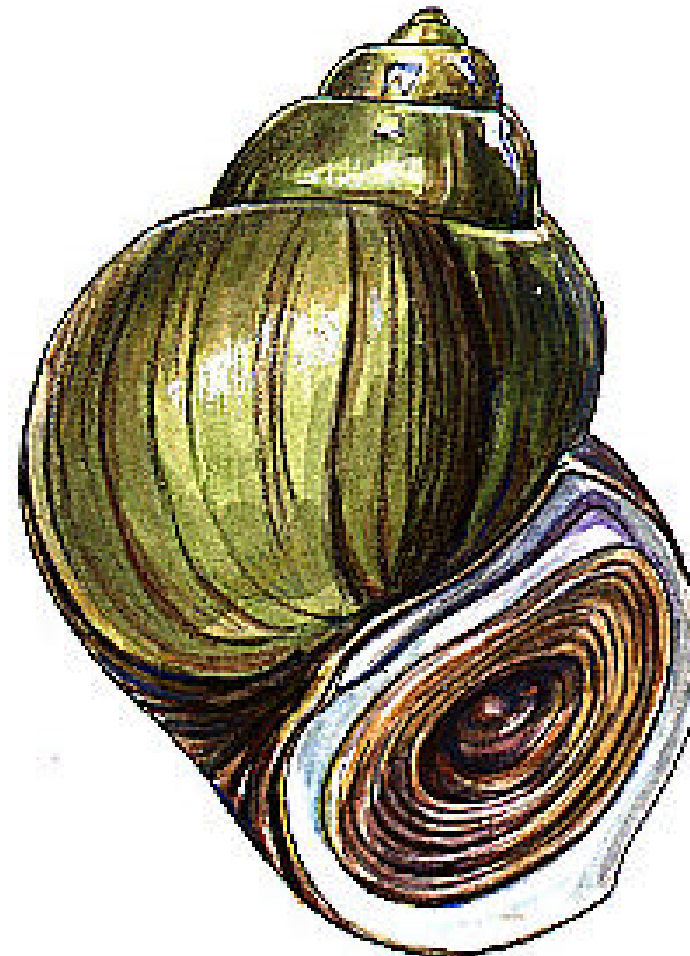


Gilled Snail



### Gilled Snails:

- ◆ Up to ¾” long
- ◆ Shell opening covered by a thin plate called an operculum
- ◆ With helix pointed up shell opens to the right
- ◆ Intolerant of pollution
- ◆ Snails in this category can be distinguished from pouch snails by the opening of the shell. To identify a snail, hold it with the tip of the shell pointed up and the opening facing you.
- ◆ If the opening is the right side, you have a snail that falls in the “other snails” category, also referred to as the “gill Breathing” snails.
- ◆ Note: The flat, coiled snails also fall into this group. Do not count empty shells.



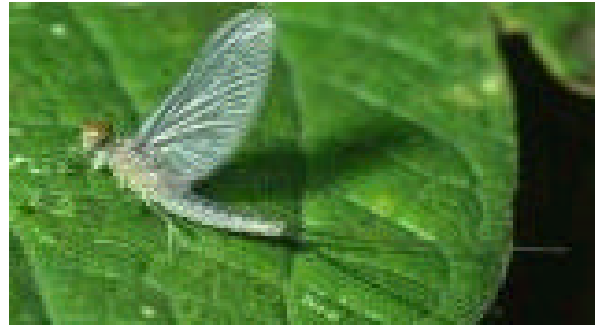
Gilled Snail



Relative Size \_\_\_\_

# Mayflies

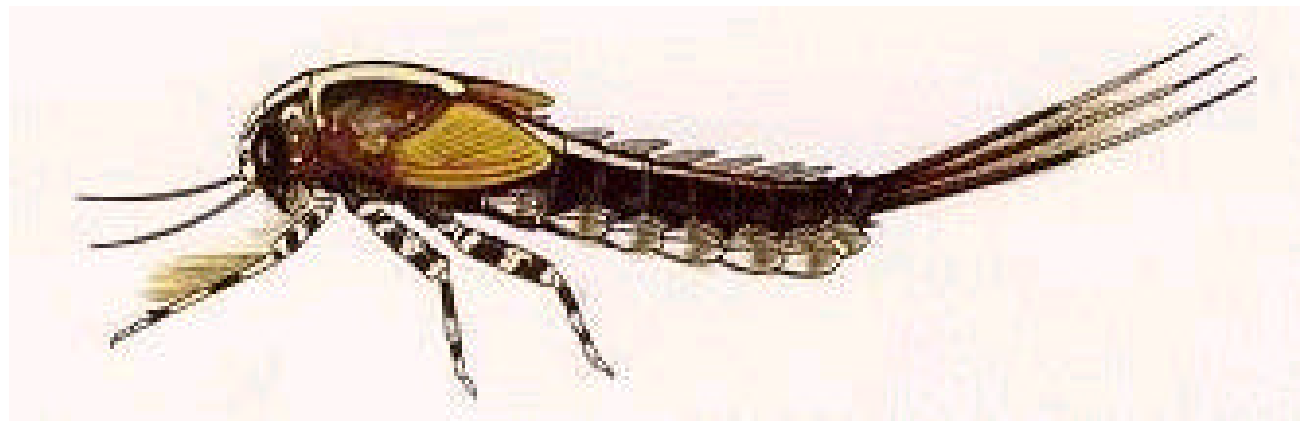
Indicators of Good Water Quality (Group One).



Mayfly adult



Mayfly nymph (*Epeorus*)



Brush-Legged Mayfly Nymph

- Mature larvae measure to 3/4 inch in length (excluding tails)
- Two rows of long hairs present on inside of front legs
- 2 or 3 tails
- Slender antennae
- The conspicuous hairs growing on the inner front legs are used for filtering food particles from the water.
- Brush-legged mayflies may be minnow like with a vertically oriented head and three tails (as pictured) or may be more flattened with a horizontally oriented head and two tails.



Mayfly (Ephemeroptera)

Relative Size \_\_\_\_\_

# Riffle Beetles

## Indicators of Good Water Quality (Group One)

Riffle beetle larvae and adults



Riffle beetle



Adult

- ◆ Riffle beetles measure approximately 1/16 to 1/4 inch in length
- ◆ Body small, usually oval
- ◆ Legs are long
- ◆ Antennae are usually slender
- ◆ Riffle beetles walk slowly underwater, they do not swim on the surface.

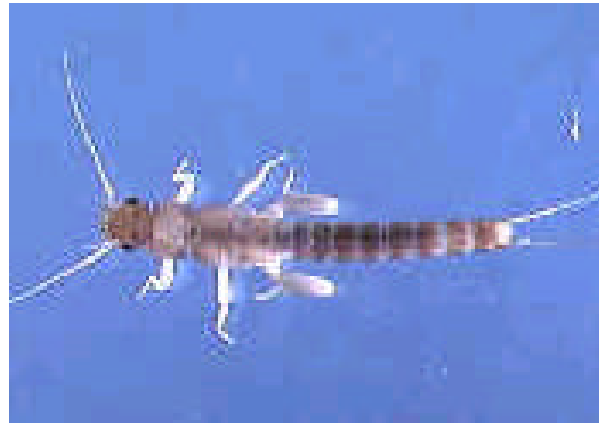


Riffle beetle larvae

Relative Size \_\_\_\_\_

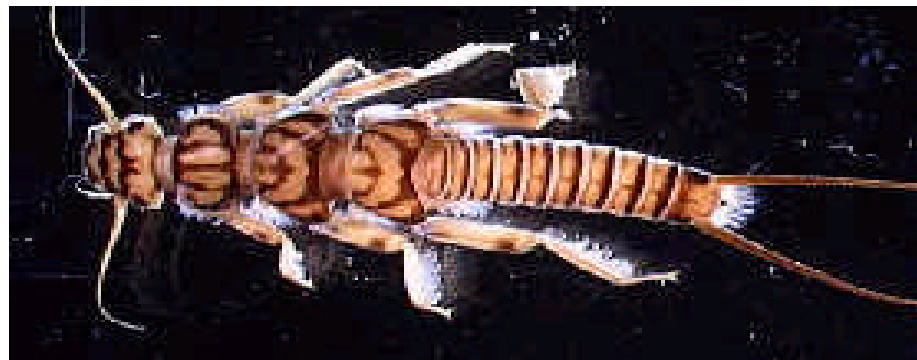
# Stonefly

## Indicators of Good Water Quality (Group One)

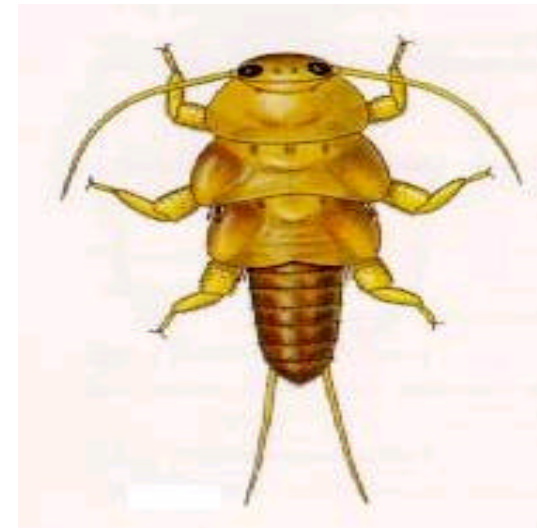


Stonefly nymph

Stonefly Nymph



- ◆ Measure 8-15mm in length (not including tails)
- ◆ 2 tails
- ◆ 2 sets of wing pads
- ◆ Sometimes have branched gills between legs on underside of body
- ◆ Yellow to brown in color; often patterned yellow and brown when mature.
- ◆ Superficially similar to certain flattened mayfly nymphs, however stonefly nymphs always have two tails, prominent antennae, and two claws at the end of each leg.
- ◆ Stoneflies are not tolerant to low levels of dissolved oxygen and therefore prefer cold, swift-moving streams. The streamlined, flattened bodies of stonefly nymphs enable them to move about the rocky streambed in rapid currents.



Roachlike Stonefly Nymph

Relative Size



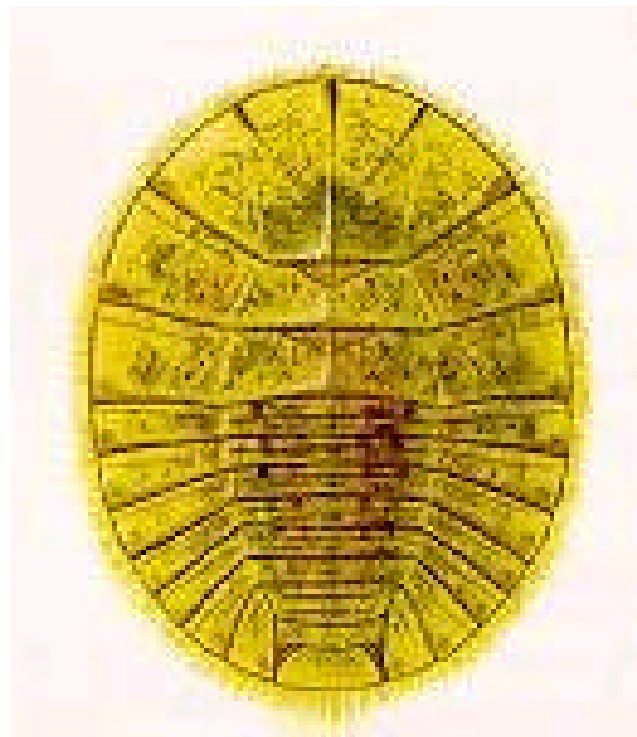
## Water Penny

Indicators of Good Water Quality (Group One).

Water  
Penny



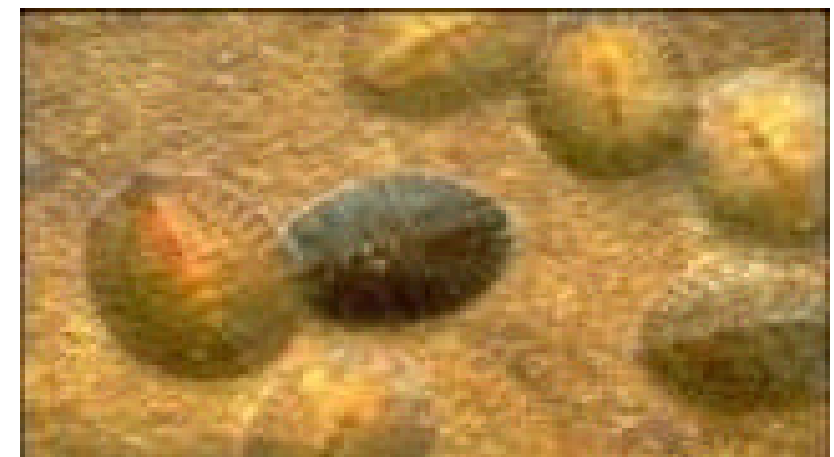
Water penny beetle larvae



### Water Penny

- ◆ Measures 1/4 inch in length Flat disk-like body
- ◆ Head and legs concealed from above  
6 legs and branched gills on underside
- ◆ Water pennies prefer cold, fast moving streams.
- ◆ Their smooth, flattened bodies enable them to resist the pull of the current.
- ◆ Water pennies are usually found on smooth rocks where they graze on attached algae.

Relative Size \_\_



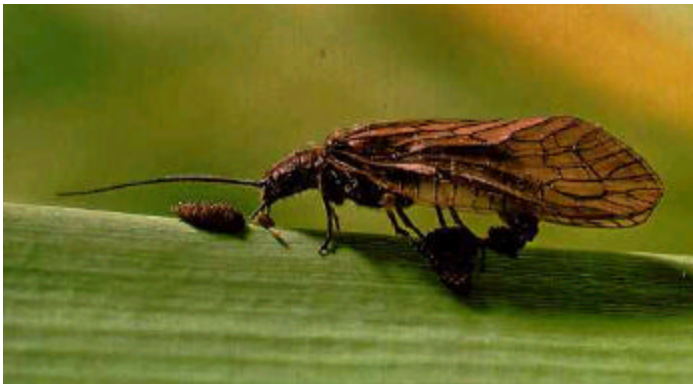
Water Penny Beetles

# Alderfly

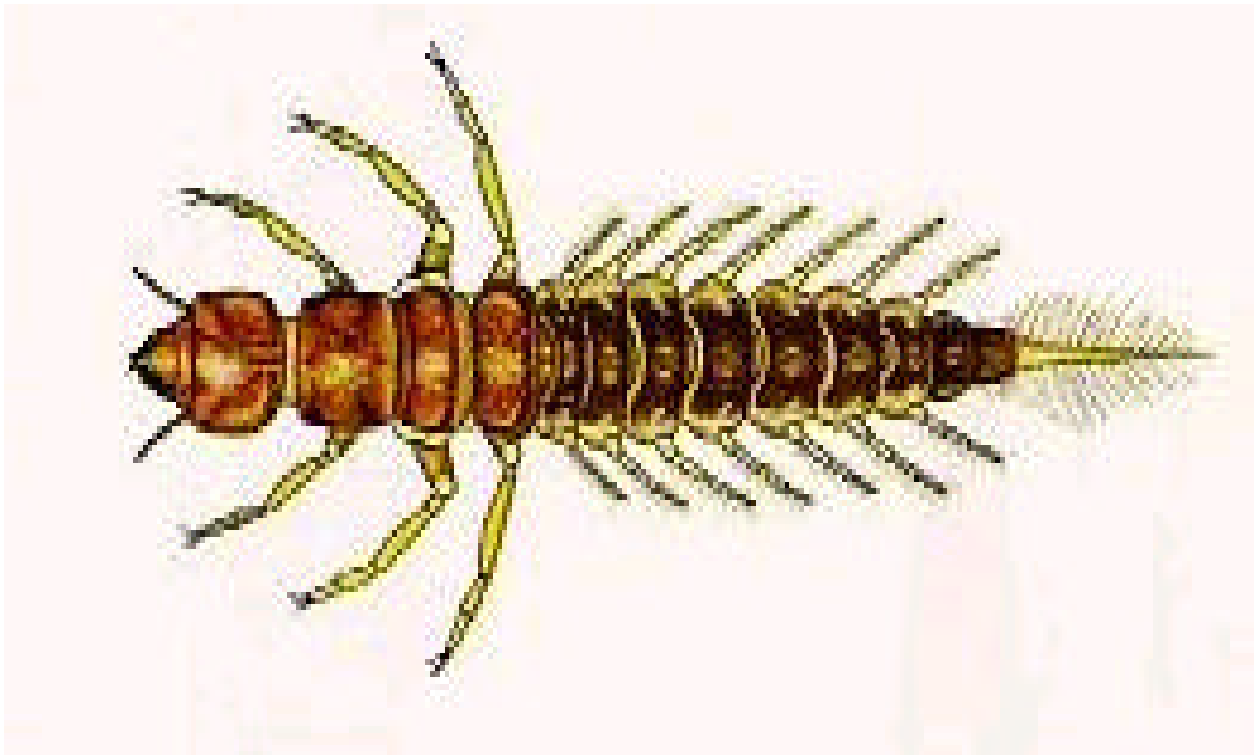
## Indicators of Moderate Water Quality (Group Two)



Alderfly larva

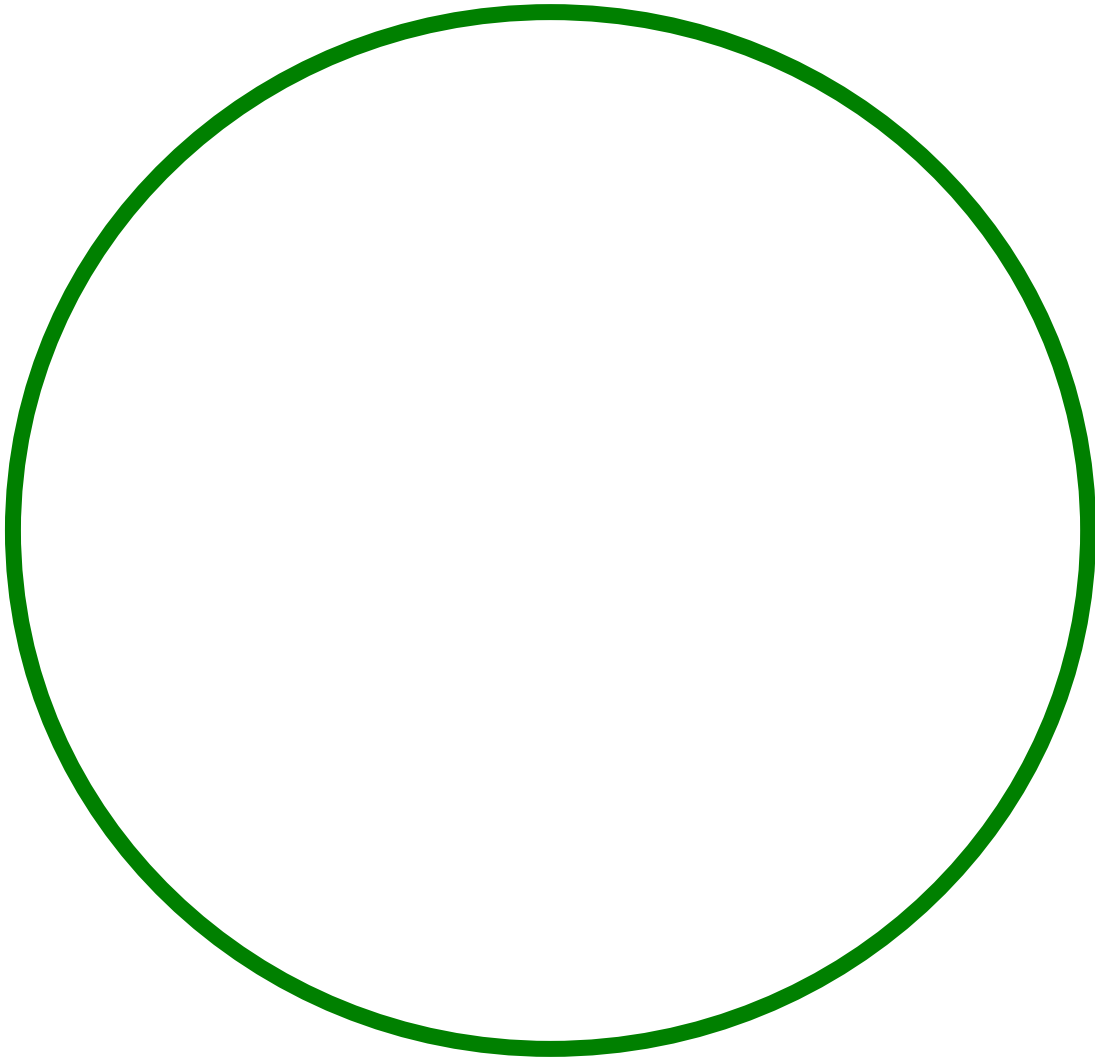


Alderfly adult



Alderfly Larva

- ◆ Measure to 1 inch in length (including tail).
- ◆ Abdomen terminates in a single tail.
- ◆ Lateral filaments along abdomen.
- ◆ Often pale to deep reddish-brown in color.



Relative size \_\_\_\_\_

Alderfly larva



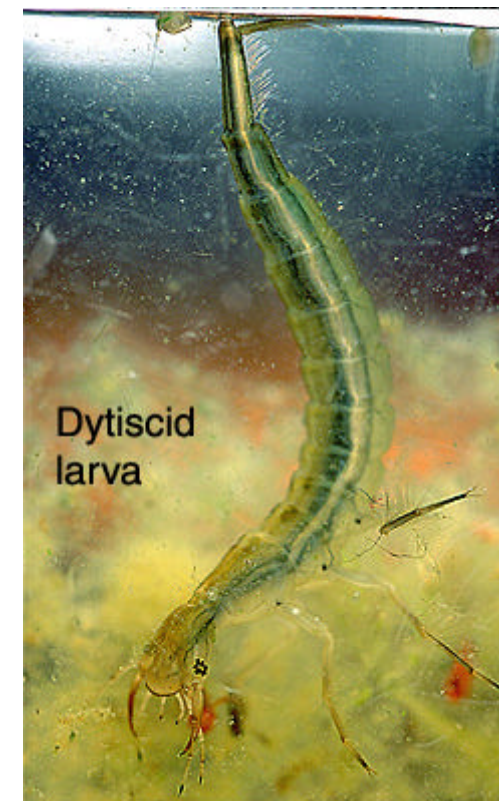
## Aquatic beetle

### Indicators of Moderate Water Quality (Group Two)

Water Beetle



beetle larva



Dytiscid  
larva

Aquatic beetle

- ◆ Head more slender than that of the dobsonfly
- ◆ 6 legs
- ◆ Some with lateral appendages
- ◆ Size range: 1/2" - 1"

Beetle larvae look somewhat similar to dobsonfly larvae, but are generally smaller, lighter in color and more slender and tapered than the dobsonfly larvae. Often the head is darker in color than the rest of the body. Beetle larvae will not have the pronounced pincers that the dobsonfly larvae possess. The appendages on the back section (abdomen) of this organism, if present, are called "lateral appendages" and should not be mistaken for legs

Relative Size \_\_\_\_\_



# Clams

Indicators of Moderate Water Quality ( Group Two)



Pond Mussel



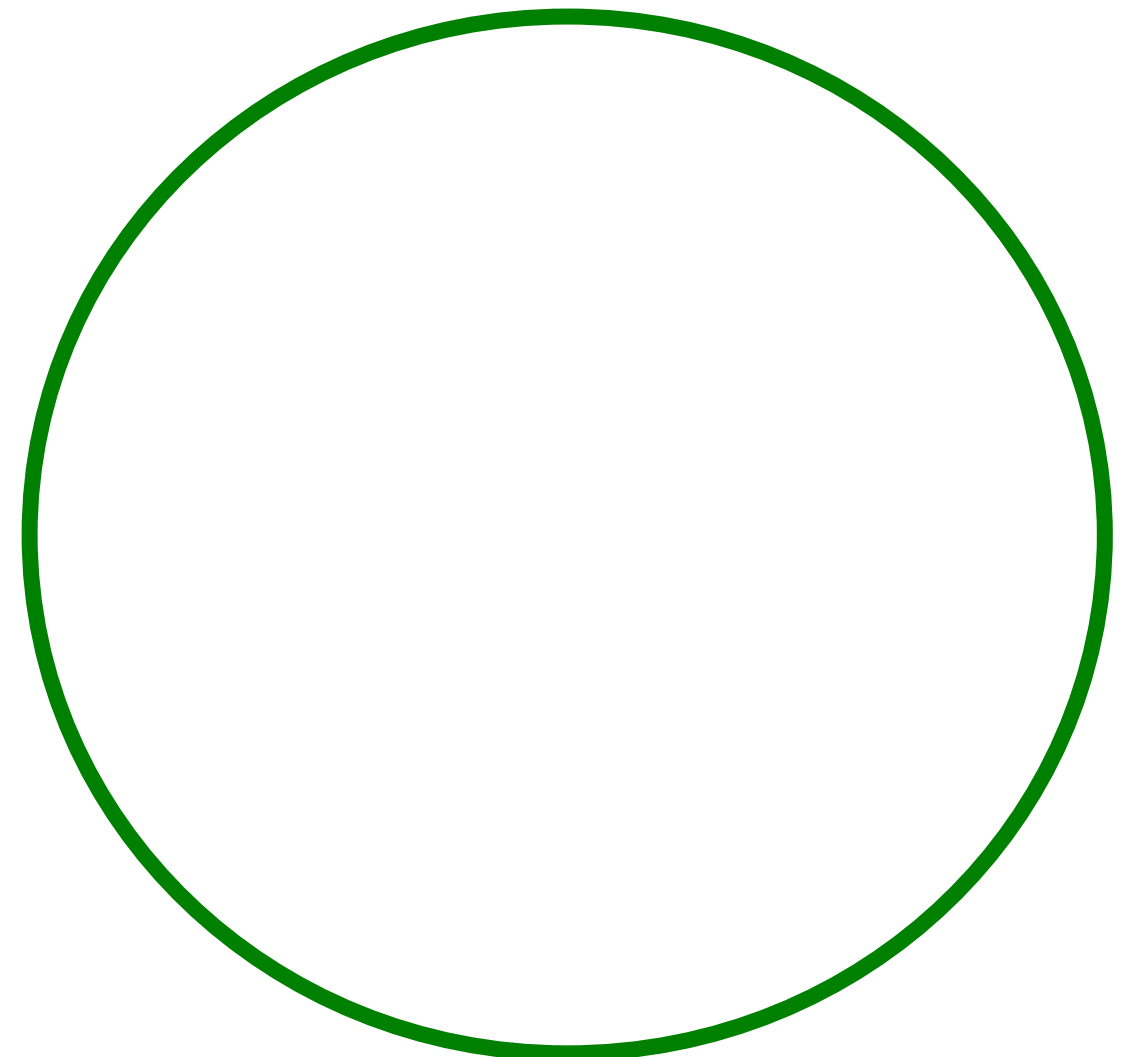
Fanshell

- ♦ Fleshy "foot" (not visible if shells are closed tightly)
- ♦ Size range: 1/8" - 5"
- ♦ Clams are easily identified by their two shells, which they will draw tightly closed when handled. Count only whole, live clams (those with both shells) in your assessment. Please do not force the shells open to see if you have a live clam. If the shell is tightly closed, you can assume the organism is alive. Note: Clams are usually buried in the stream bottom, so you should kick up the sampling area thoroughly. Also, as indicated by the size range, clams can be quite small and fragile, so look carefully and handle carefully. Do not count empty shells.
- ♦ Many Clams are endangered so immediately return to the stream where you found them.

Clams



Relative Size \_\_\_\_\_



Clams (Class Bivalvia (Pelecypoda))



# Craneflies

## Indicators of Moderate Water Quality (Group Two)



Cranefly larvae



Cranefly larva



### Cranefly Larva

- ◆ Measure 1/3-2 inches in length
- ◆ Plump caterpillar-like segmented body
- ◆ Head is usually retracted into the body
- ◆ Milky green to brown color
- ◆ Four finger-like lobes at back end of body

Relative Size \_\_\_\_\_

Cranefly adults, who are often mistaken for giant mosquitoes, are actually harmless. They are long and slender with very long legs. "Mosquito hawk" is another common name given to the cranefly.

